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E. V. HUNTINGTON: 'Note on the Fundamental Propositions of Algebra' (preliminary communication).

C. J. KEYSER: 'Concerning a Self-reciprocal Plane Geometry.'

C. L. E. MOORE: 'Geometry of Circles Orthogonal to a Given Sphere.'

EDWARD KASNER: 'Invariants of Differential Elements for Arbitrary Point Transformation.'

A. B. FRIZELL: 'A Method of Building up the Fundamental Operation Groups of Arithmetic.'

G. A. BLISS: 'A Proof of the Fundamental Theorem of Analysis Situs.'

O. P. AKERS: 'On the Congruence of Axes in a Bundle of Linear Line Complexes.'

PETER FIELD: 'Note on Certain Groups of Transformations of the Plane into Itself.'

GEORGE PEIRCE: 'On a New Approximate Construction for π .'

MAX MASON: 'Curves of Minimum Moment of Inertia.'

A. G. WEBSTER: 'Application of a Definite Integral with Bessel's Functions to the Self-induction of a Solenoid.'

J. E. WRIGHT: 'Correspondence and the Theory of Continuous Groups.'

J. E. WRIGHT: 'An Application of the Differential Invariants of Space.'

CLARA E. SMITH: 'Abel's Theorem and its Application to the Development of an Arbitrary Function in Terms of Bessel's Functions.'

V. F. BJERKNES: 'Experimental Demonstration of Hydrodynamic Action at a Distance.'

R. P. STEPHENS: 'On the Pentadeltoid.'

M. I. PUPIN: 'Establishment of a Steady State in a Sectional Wave Conductor.'

J. J. QUINN: 'A Linkage for the Kinematic Description of a Cissoid.'

The Chicago Section held its eighteenth regular meeting at the University of Chicago, December 29-30. The San Francisco Section will meet at Stanford University on February 24. The next regular meeting of the society will be held at Columbia University, February 24. The summer meeting, together with a colloquium, will be held at Yale University in August.

F. N. COLE,
Secretary.

SCIENTIFIC BOOKS.

Publications of the Jesup North Pacific Expedition. (Memoir of the American Museum of Natural History, New York.) Leiden, E. J. Brill, Ltd.; New York, G. E. Stechert & Co.

The continuation of the publications of the Jesup North Pacific Expedition appears, after an interval of several years, published by E. J. Brill, Leiden. The following notice of the publications issued during the year 1905 is written by the editor of the series, and for this reason contains only a brief statement of the contents of the volumes.

Vol. III., Part III., *Kwakiutl Texts.* By FRANZ BOAS and GEORGE HUNT.

This number closes the volume containing the Kwakiutl texts recorded by George Hunt, and revised and edited by Franz Boas. The material in this volume has been arranged according to tribes of the Kwakiutl, beginning with the extreme south, and proceeding northward. The first text in the series is given in interlinear translation; while all the others are given in parallel columns, Indian and English. At the end of the volume is given a brief abstract of the traditions, which are intended to enable the reader to inform himself regarding the contents of the volume without reading the full texts. The abstracts are provided with page references, which facilitate the finding of any particular passage. An appendix to the volume contains lists of stem words and suffixes, by means of which the philological use of the text is facilitated.

The present volume contains almost entirely traditions relating to the ceremonies and families of the Kwakiutl Indians, and illustrates the exuberance of legends of this character that have developed among this tribe. In character and contents, these traditions are remarkably uniform. They resemble the traditions of the northern parts of the North Pacific coast, and account for the privileges of the different families and tribes of the Kwakiutl.

The language is probably, on the whole, accurate. Mr. Hunt, the recorder, speaks Kwakiutl as his own mother tongue, and has

been trained in writing the language by long practise, and under the guidance of the editor. All the texts have been phonetically revised with the assistance of other Indians. Notwithstanding the care that has been taken, there remain many uncertainties and obscure points; but the material seems sufficient to elucidate all the main points of the Kwakiutl language.

In the eighteenth chapter texts of speeches and war accounts are given, translations of which were published in Franz Boas's account of the 'Secret Societies and Social Organization of the Kwakiutl Indians,' published in the Report of the U. S. National Museum for 1895.

The style of most of the texts is diffuse, but it was thought well to retain the full accounts, because the stories contain a great many data relating to the every-day customs and beliefs of the tribe.

A second volume of texts of this tribe is in press. It contains the mythological traditions relating to the origin of the world, and supplements in this respect the material contained in the first volume.

Vol. V., Part I, *Contribution to the Ethnology of the Haida*. By JOHN R. SWANTON.

This volume contains parts of the results of an expedition undertaken by Dr. John R. Swanton to the Queen Charlotte Islands. His expedition was undertaken in coöperation with the Bureau of American Ethnology, the understanding being that the linguistic results (that is, the grammar and dictionary of the Haida language) were to be published by the Bureau of Ethnology, while the ethnological results and traditions were to be published by the Jesup North Pacific Expedition.

The present volume contains, primarily, data relating to the social organization of the Haida. In the first chapter of the book, interesting information is given on shamanism, witchcraft, medicine, customs, taboos and games of the tribe. In the beginning of the book the cosmic notions of the Haida are described, which are of great importance for a clear understanding of their social organization. It is interesting to note that the

supernatural beings of the Haida are divided into two groups, in the same way as the tribes themselves—the Raven group and the Eagle group.

Perhaps the most important part of the author's discussion is the description of the division of the two sides of the Haida into families. The two sides, or clans, are exogamic, while the families are primarily local subdivisions of the clans. The detailed explanation of this grouping is given in a chapter entitled 'Haida History,' in which the author endeavors to present the history of the present families of the Haida as conceived by the Haida themselves. He begins with the mythological period, when the islands, the home of the Haida, arose from the ocean, and continues with the origin of the ancestors of the Raven clan and of the Eagle clan, through more or less mythical events, down to the historical events of the last few centuries, describing the gradual splitting-up and recombination of various families. Based on this discussion, he has reached the interesting conclusion, that, according to the idea of the Haida, the Raven clan is indigenous, while the Eagle clan may possibly represent descendants of immigrants from the mainland. There is, however, some evidence of a tendency to make the traditions of the two clans uniform.

The families settled in the various villages have certain prerogatives, the most important of which are the crests. A discussion of these shows that the principal crests of the Raven clan are the killer-whale and grizzly bear, while the principal ones of the Eagle clan are the eagle and beaver. Besides these, there are a great many scattering crests, many of which were obtained by purchase or gift, and which can not be in any way considered as totems.

A rather full discussion of the representation of the crest and of the myth in art contains detailed descriptions of a considerable series of totem-poles, showing that most of these are crest figures of a house-owner and of his wife, while others represent incidents in myths. Similar representations are found on grave-posts and on canoes, and on boxes, spoons and other utensils used by the people.

Several plates of tattooings representing crests are also discussed in this chapter, which is the most extensive explanation given, up to this time, of carvings and paintings from any one tribe of the North Pacific coast.

The description of the secret societies and potlatches of the Haida is not as complete as we should like to see it; but it is impossible at the present time to obtain full information on this point, because the old customs have become obsolete, and, owing to the great reduction in numbers of the tribe, the information which can be obtained now is fragmentary and contradictory. It is interesting, however, to note that the secret societies are also owned by various families, and that the conclusion previously reached of the introduction of the more important societies from the south is corroborated by information furnished by the Haida.

The last chapter of the book contains abstracts of Haida traditions. These consist of two series, one collected in Skidegate, another in Masset, and written in these two dialects of the Haida language. The Masset texts will be published in another volume of the publications of the Jesup Expedition. The Skidegate texts were written out by the author for publication by the Smithsonian Institution. A few texts and the translations of other traditions have just been issued as a Bulletin of the Bureau of American Ethnology. We may perhaps express the wish that a way may be found for publishing the full texts, which are required for a thorough study of the ethnology of the tribe. The abstracts of the traditions are accompanied by notes, giving parallel traditions from the North Pacific coast.

The volume closes with lists of the families, villages and houses of the Haida. This part of the book is accompanied by a number of interesting maps, compiled by Dr. Charles F. Newcombe, on which the native names of places and the locations of towns are recorded. These maps also contain many improvements on the last issue of the British Admiralty Maps.

Vol. VI., Part I., *The Koryak*. By WALDEMAR JOCHELSON.

Mr. Jochelson's description of the Koryak is based on his studies carried on in 1900-1 for the Jesup North Pacific Expedition. The subjects treated are the religion and the mythology of the tribe. The reason why the author began the publication of his studies with this subject was the necessity of coordinating his publication with that of Mr. Bogoras, who was at the same time publishing his studies of the material culture of the Chukchee. We obtain here for the first time an insight into the peculiar beliefs of the tribes of the Okhotsk Sea and of Kamchatka, which were first described by Steller.

The first chapter is taken up with historical remarks relating to previous information on the subject. In the second chapter a detailed description of supernatural beings is given. The principal of these is Big-Raven. He is looked upon by the Koryak as the founder of the world. He is also called Creator. In this respect, the Koryak belief differs from that of the Chukchee, who consider the Creator and Big-Raven as separate beings. Although Raven is the trickster of Koryak mythology, he is at the same time the great transformer, who has given the world its present shape. He is the first man, father and protector of the Koryak. Prayers are addressed to him, and he is appealed to in incantations. Sacrifices are also made to him. Almost all the Koryak myths, with very few exceptions, deal with the life, travels, adventures, and tricks of Big-Raven and his family.

Besides Big-Raven, the Koryak believe in a supreme being, the conception of whom, however, is vague. He sent Big-Raven down to our earth to establish order, and he seems to be the personification of the vital principle in nature taken in its entirety. He is described as an old man, living in a village in heaven, and having wife and children. Offerings are made to him to secure future prosperity, or as an atonement for the transgression of taboos. It is their belief, that, so long as the supreme being looks down upon earth, there is abundance and health, while, as soon as he turns away, disorder reigns. The supreme being does not seem to interfere in detail with the affairs of man.

A very important place in the system of religious ideas of the Koryak is taken by the *kalau*, or spirits, who appear as invisible beings. Sometimes they appear as common cannibals. These malevolent spirits are very numerous, and cause sickness and death. Some of them represent special diseases. The Koryak also believe in supernatural beings, that appear as rulers of various parts of the country, such as the 'master of the sea.'

As a protection against disease and misfortune sent by supernatural agencies, guardians and charms are used. The most important among these are the sacred implements for fire-making, which are considered the guardians of the reindeer herd, and to which are often attached rude carvings, representing the guardians' assistants. Among the Maritime Koryak, the fire-board is essentially the protector of the house. Carved wooden figures representing human beings are also used as guardians. Many of these are ornamented with sedge-grass. While many are small, there are also carved trees which stand near the house, and which are guardians of the house or of the village. Much valuable information relating to the significance of charms is given in this chapter.

The Koryak also used divining-stones, which are employed to divine the future by their movements when suspended from a thong. These are similar to the divining-stones of the Eskimo.

Mr. Jochelson discusses the method of shamanism from two aspects. There are professional shamans among the Koryak, who wear certain ornaments that distinguish them from other people, and who free the sick from disease inflicted by the evil spirits. The drums used by these shamans are similar in type to those used by other Siberian tribes. They differ from those of the Eskimo. Each family has also its own shamans, who protect the family. The peculiar ideas in relation to the change of sex of shamans which are found among the Eskimo, are also found among the Koryak.

Of especial interest is the description of the festivals and sacrifices of the tribe. The most important festival of the Maritime Koryak

refers to whale-hunting, and consists principally of the welcoming of the captured whale, and of the ceremony accompanying its supposed return to the sea. In this festival masks made of wood and of grass are worn. The wooden masks resemble in type the simple masks of the northern Alaska Eskimo. The ceremonials of the Reindeer Koryak refer principally to the herd, and are intended to promote its welfare. A number of minor festivals relate to hunting.

The Koryak offer sacrifices to the supernatural beings. Both bloody and bloodless sacrifices occur. Among the former, the sacrifices of reindeer and of dogs are the most important. Mr. Jochelson describes in detail the peculiar custom of sacrificing dogs, and of attaching their bodies to poles or to the trees which represent the village guardians.

In the description of customs relating to burials, deaths and funerals, the complex burial customs deserve particular mention. The Koryak cremate the dead, who for this purpose are dressed in very elaborate costumes, which the people carry about during life, although they are finished only after death has occurred.

The whole second part of the book is taken up with the mythology of the Koryak, the material being arranged in geographical order. The whole mythology is remarkably uniform, dealing essentially with the marriages of the children of Big-Raven, and of his struggles with supernatural beings. Attention may be called, in this connection, to the brief characterization of Koryak tales given on p. 352 and the following pages. In the final chapter of his book, Mr. Jochelson gives a detailed comparison of the incidents found in Koryak mythology, with incidents of other mythologies of Siberia, of that of the Eskimo and of the North American Indians. It would seem that some of the elements contained in this comparison are so general, that perhaps their occurrence in these several mythologies may be without significance, so far as evidence of historical transference is concerned; but the results of Mr. Jochelson's statistical comparison are of considerable interest. He finds that among 122 episodes that belong to Kor-

yak mythology, 102 are also found in Indian myths, 30 in those of the Eskimo, and 25 in those of the Old World. He further finds that 8 are common to the Koryak, Indian, Eskimo and the Old World; 10 to Koryak, Indian and Eskimo; but none to the Koryak, Eskimo and Old World. From this the author draws the conclusion that the interchange of mythological elements between the Indians and the Koryak must be older than that between the Koryak and the Eskimo.

Vol. VII., Part I., *The Chukchee*. By WAL-DEMAR BOGORAS.

The long-continued studies of Mr. Bogoras carried on in the Kolyma district from 1889 to 1898, and his later studies for the Jesup North Pacific Expedition at Anadyr and on the coast of the Chukchee Peninsula, enable him better than any one else to describe the ethnology of the Chukchee. His book is full of remarks which show the intimate acquaintance of the writer with the people he is describing. In the present volume, the habitat, the general characteristics and the trade of the people are described; but the principal contents of the volume relate to their material culture. The discussion of the methods of reindeer-breeding of the Chukchee leads to the conclusion that the domestication of the reindeer among them is probably recent; that in previous times the Chukchee were a littoral people, like the Eskimo, and that they lived principally by hunting sea-mammals. The method of treatment of the reindeer differs from that used by the Tungus and other western Siberian tribes. The domestication of the reindeer is less complete; it is not used for riding, but mainly for hauling sledges, and the method of harnessing is peculiar to the Chukchee. Mr. Bogoras also shows that the present method of dog-harnessing, which is the same as that used by other Siberian tribes, is probably a new one, and that formerly the dogs were harnessed in the same way as those of the Eskimo, *i. e.*, all attached at one point, not in pairs, as is customary at the present time. The various kinds of sledges used for the reindeer and the dog are also described in detail.

The method of hunting sea mammals, is

essentially identical with that used by the Alaskan Eskimo. In traveling on sea, the Chukchee use a skin boat, similar to the Eskimo boat. The kayak, with double-bladed paddle, is also used. Its distribution is rather peculiar. It exists on the Arctic Ocean, it is not found on the coast of the Pacific, but it appears again on the waters of the Middle Anadyr River. Then it disappears again for a long stretch, to appear finally on the Okhotsk Sea among the Maritime Koryak.

The traps are similar to those of the Eskimo, but a considerable amount of West Siberian influence may be noticed. Automatic bows and spring-traps, such as are found also among the Alaskan Eskimo, are clearly derived from Asiatic patterns. The throwing-board of the Eskimo occurs also among all the eastern Chukchee.

A detailed description of the sinew-backed bows and of the composite bow is given. The composite bows are similar in type to those found in more southern regions of Siberia. The throwing-whip (p. 158), which is used for propelling darts, is worth mentioning. Mr. Bogoras also describes the iron-work, which is used particularly for knives and lances. These are clearly influenced by the iron-work of the Yakut and of the Amur River tribes. Of especial interest is a description of armor, which was also formerly used by the Chukchee. This is made of small pieces of iron linked together and arranged in horizontal rows. The head was protected by a helmet of similar character, while around the neck there was a large wooden protector incased in hide, with movable wings. It seems probable that the ivory armor found in Alaska was an imitation of this iron armor, which, in its turn, may be related to the peculiar types of armor current in more southern parts of eastern Asia.

The detailed description of the Chukchee tent brings out the fact that the large and heavy tent of the tribe is not well adapted to the nomadic mode of life necessitated by the care of reindeer-herds. It seems plausible that the movable tent must be considered as a direct adaptation of the old permanent winter-house of the Maritime tribe to the

necessities of the present nomadic life of the tribe.

The clay lamps and kettles and other household utensils are similar to those of the Eskimo of the Yukon River.

The food of the Maritime Chukchee is to a very great extent derived from the sea, consisting largely of sea-mammals, while the Reindeer Chukchee live on reindeer taken from their herds. In connection with this subject, the author describes a number of taboos. Vegetable food is used rather as a substitute, in case of scarcity of meat, than as a side-dish.

In smoking, pipes evidently related to those of Chinese type are used.

One chapter of the book is devoted to a description of the manufactures, among which those relating to the preparation and utilization of skins occupy a prominent part.

The clothing is made of skins, that of the men consisting of skin boots and stockings, trousers and a double shirt, while the women wear combination-suits. It is peculiar to note that the fur jackets of the women are cut very low. In cold weather separate hoods are worn.

The women, particularly those of the Maritime Chukchee, are tattooed, and the tattooing is believed to have a magical significance. Many of the ornaments described by the author are also at the same time charms.

The book closes with a description of the games and sports of the people, among which tossing on blankets, wrestling and races play a prominent part. A number of ball games, and some cat's-cradles are described. The book is accompanied by many illustrations and by a detailed map, giving exact information as to the present location of the native tribes of northeastern Asia. It appears from this map that the Eskimo are confined to the region north of Anadyr Bay, and that the coast regions southwest of this district are occupied by the Kerek, a branch of the Koryak. Another map (p. 17) gives the approximate ancient distribution of the tribes before the invasion of the Yakut and of the Russians.

FRANZ BOAS.

Nebula to Man. By HENRY R. KNIPE. With fourteen full-page illustrations in color and fifty-seven full-page tinted illustrations by Ernest Bucknall, John Charlton, Joseph Smit, Lancelot Speed, Charles Whympster, Edward A. Wilson and Alice B. Woodward. London, J. M. Dent & Co. 1905. Small folio. Pp. xvi + 251.

This sumptuous volume, beautiful in typography, glowing with splendid illustrations from the studies of the most skillful delineators of animal life in the British metropolis, is a marvel in more ways than one. Its publication is remarkable from the standpoint both of the man of science and of the man of letters. It is 'an attempt to present a sketch of the evolution of the earth on the nebular hypothesis,' and this not in prose, but in the form of poetry. In six cantos the author traces the great drama of mundane evolution. The first division of the poem deals with the development of the globe from the nebula out of which it was evolved, and the beginning of the operations of life upon its slowly cooling surface; the next four cantos deal in order with the Paleozoic, the Mesozoic, the Cenozoic and the Quaternary ages; the last canto brings Neolithic man into view, and leaves us at the threshold of human history. The attempt to clothe the latest results of geological and paleontological research in the garb of poetry is daring. To marshal the facts of the paleontological laboratory in metric guise and to compel the sesquipedalian terms of the geologist and comparative anatomist to bend themselves to the service of the muse is bold indeed. While not always successful, nevertheless in the main the author has forced the cumbersome terms of science to do duty with grace, and has clothed a vast body of scientific facts in the garments of verse.

The opening lines, which face a splendid reproduction of a photograph of the great nebula in Orion made at the Yerkes Observatory, present a graphic picture of the planetary system in the making:

A glowing mist, through realms of space un-
bounded,
Whirls on its way, by starry hosts surrounded.
Dim is its lustre as compared with theirs,